TECHNICAL NOTE NUMBER 172

FOREST PRODUCTS LABORATORY - U. S. FOREST SERVICE MADISON, WISCONSIN

HOW TO OBTAIN RIGIDITY IN CRATE CONSTRUCTION

One of the features of a good crate is rigidity or ability to resist weaving and skewing during transportation. No method of joining the corner members of a crate, not even the 3-way corner construction, is sufficient alone to give rigidity to a crate. Some kind of bracing across the faces is usually necessary.

Figure 1 shows a kind of bracing found in many crates which are sent to the U. S Forest Products Laboratory, Madison, Wisconsin, for testing. Partly because of the amount of material used, this construction appears to be very strong. Laboratory tests have shown, however, that crates so braced are weak in the diagonal direction of the faces, and are therefore apt to weave and skew during transportation.

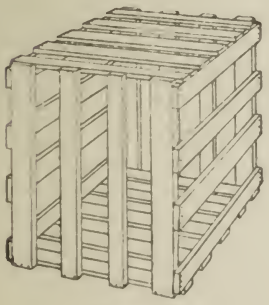

FIG. 1

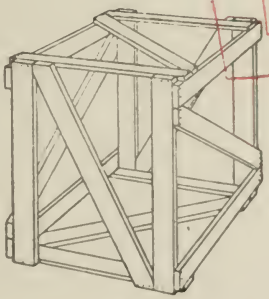

FIG. 2

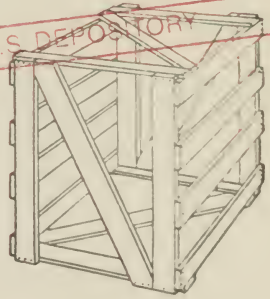

FIG. 3

Diagonal braces on six sides as shown in Figure 2 have been found to give a crate maximum rigidity for a minimum amount of lumber. Crates so braced withstood with considerably less distortion twice as great a diagonal compressive force in actual tests as crates braced as shown in Figure 1.

A combination of diagonal and parallel slat bracing, as shown in Figure 3, makes the crate more rigid than parallel bracing alone but not so rigid in all directions as cross bracing on the six sides. It may be found an advantageous construction in packing contents which need protection on the sides and are rigid enough themselves to withstand stresses in the direction in which the crate is weak.

Solid sheathing on all the faces does not make a crate so rigid as diagonal bracing, except perhaps sheathing which is made of wide boards with tighter joints than can usually be obtained. The crate with ordinary sheathing might withstand as great a load, but the distortion caused by that load would be greater than in a crate with diagonal braces, and would ordinarily be great enough to allow damage to the contents.